

REMARKS

Please reconsider the present application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering the present application and for the courtesies extended in the telephonic Examiner Interview of August 14, 2003.

I. Disposition of Claims

Claims 1-18 are pending in the present application. By way of this reply, claims 1 and 8 have been amended and claim 18 has been canceled without prejudice or disclaimer.

II. Claim Amendments

Independent claims 1 and 8 have been amended to recite that a surface area of an uncovered peripheral portion of the top surface of the package substrate is no greater than 20% of a total surface area of the top surface of the package substrate, where the uncovered peripheral portion is defined as a surface area of the top surface of the package substrate between an outside perimeter of the unitary windowframe capacitor and a perimeter of the package substrate. No new matter has been added by way of these amendments.

III. Rejection(s) Under 35 U.S.C § 103

Claims 1-3, 5, 7, 8, 11-13, and 18

Claims 1-3, 5, 7, 8, 11-13, and 18 of the present application were rejected under

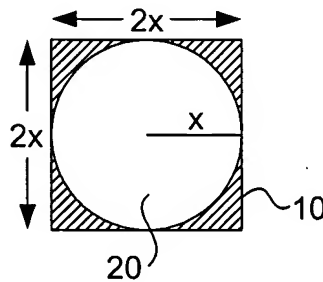
35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,839,712 issued to Mamodaly et al. (hereinafter "Mamodaly") in view of Applicant's Prior Art Figures. For the reasons set forth below, this rejection is respectfully traversed.

With reference to Figure 4 of the present application, the present invention is directed to a unitary "windowframe" capacitor 27 having an aperture formed therein so as to allow the unitary capacitor 27 to be positioned on a top surface 12 of a package substrate 13 around a semiconductor die 11. Moreover, as recited in amended independent claims 1 and 8 of the present application, when the unitary "windowframe" capacitor 27 is disposed on the semiconductor die 11, a surface area of an uncovered peripheral portion of the top surface of the package substrate is no greater than 21% of a total surface area of the top surface of the package substrate, where the uncovered peripheral portion is defined as a surface area of the top surface of the package substrate between an outside perimeter of the unitary windowframe capacitor and a perimeter of the package substrate. This limitation is further discussed below with reference to Mamodaly.

Mamodaly, in contrast to the present invention, fails to disclose all the limitations recited in amended independent claims 1 and 8 of the present application. For example, Applicant refers to Figure 7 of Mamodaly, which shows a three quarter side view of the apparatus disclosed in Mamodaly. In Figure 7 of Mamodaly, an annular, *i.e.*, circular, capacitor 17 is positioned on a top surface of a package substrate 11 around a semiconductor die 9. As evident in Figure 7 of Mamodaly, an uncovered peripheral portion of the top surface of the package substrate 11 between an outside perimeter of the capacitor 17 and a perimeter of the package substrate 11 is relatively greater than an

uncovered peripheral portion of a top surface of the package substrate according to the present invention as shown, for example, in Figure 4 of the present application. To geometrically and mathematically prove this, Applicant submits the following:

In order to minimize the uncovered peripheral portion of a top surface of a package substrate according in Mamodaly, an outside perimeter of the annular capacitor (e.g., 7 in Figures 4 and 5 of Mamodaly and 17 in Figure 7 of Mamodaly) must be extended to the extent possible to the edges of the package substrate as shown below:



Referring to the figure above, the dashed portions of the package substrate 10 represent those portions of the top surface of the package substrate 10 not covered by the annular capacitor (showed without an aperture for purposes of illustrative clarity) 20. The surface area of the covered portions of the top surface of the package substrate 10 is equal to 78.5% of the total surface area of the top surface of the package substrate 10 ($\pi x^2 / 4x^2$, where πx^2 equals the maximum area of the annular capacitor 20 and $4x^2$ equals the total surface area of the top surface of the package substrate 10). Accordingly, the minimum surface area of the uncovered peripheral portion of the top surface of the package substrate 10 as inherently taught by Mamodaly must be greater than 21% (100% - 78.5%) of the total surface area of the top surface of the package substrate 10.

Those skilled in the art will note that the example presented above represents the absolute minimum surface area of the uncovered peripheral portion as shown in any of

the figures or textual portions in Mamodaly. For example, with respect to configurations in which the package substrate is rectangular, and not square as presented above, the surface area of the uncovered peripheral portion would be even greater.

On the other hand, in order to provide maximum capacitance and the maximum possible area for mounting components on top of the “windowframe” capacitor (*see* Specification, paragraph [0022]), the present invention as recited in amended independent claims 1 and 8 of the present application utilizes the surface area of the top surface of the package substrate to the maximum extent possible such that the surface area of the uncovered peripheral portion is no greater than 21% of the total surface area of the top surface of the package substrate, where the uncovered peripheral portion is defined as the surface area of the top surface of the package substrate from an outside perimeter of the “windowframe” capacitor to a perimeter of the package substrate. Thus, as shown by way of the extreme example presented above, Mamodaly necessarily fails to disclose this limitation of amended independent claims 1 and 8 of the present application.

Applicant’s Prior Art Figures fail to disclose a unitary “windowframe” capacitor altogether, and thus, necessarily cannot disclose the limitation of the uncovered peripheral portion of the top surface of the package substrate having a surface area no greater than 21% of a total surface area of the top surface of the package substrate as recited in amended independent claims 1 and 8 of the present application.

In view of the above, Mamodaly and Applicant’s Prior Art Figures, whether considered separately or in combination, fail to show or suggest the present invention as recited in amended independent claims 1 and 8 of the present application. Thus, amended independent claims 1 and 8 of the present application are patentable over

Mamodaly and Applicant's Prior Art Figures. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 4

Claim 4 of the present application was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mamodaly in view of Applicant's Prior Art Figures and U.S. Patent Application Publication No. 2002/0011354 (hereinafter "Barnett"). For the reasons set forth below, this rejection is respectfully traversed.

Like Mamodaly and Applicant's Prior Art Figures, Barnett fails to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 1 of the present application. Barnett, which discloses co-fired ceramic multi-chip modules for high density interconnects between electronic devices (*see* Barnett, Abstract), is completely silent as to a unitary capacitor having an aperture formed therein, and thus, necessarily cannot disclose the limitations of amended independent claim 1 of the present application missing in Mamodaly and Applicant's Prior Art Figures.

In view of the above, Mamodaly, Applicant's Prior Art Figures, and Barnett, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 1 of the present application. Thus, amended independent claim 1 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, and Barnett. Dependent claim 4 of the present application

is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 6

Claim 6 of the present application was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mamodaly in view of Applicant's Prior Art Figures and U.S. Patent No. 6,215,171 issued to Pape (hereinafter "Pape"). For the reasons set forth below, this rejection is respectfully traversed.

Like Mamodaly and Applicant's Prior Art Figures, Pape fails to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 1 of the present application. Pape, which discloses an integrated circuit module design that provides a package surrounding a passive component and a base disposed on an integrated circuit (*see* Pape, column 1, lines 34 – 41), is completely silent as to a unitary capacitor having an aperture formed therein, and thus, necessarily cannot disclose the limitations of amended independent claim 1 of the present application missing in Mamodaly and Applicant's Prior Art Figures.

In view of the above, Mamodaly, Applicant's Prior Art Figures, and Pape, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 1 of the present application. Thus, amended independent claim 1 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, and Pape. Dependent claim 6 of the present application is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is

respectfully requested.

Claims 9 and 17

Claims 9 and 17 of the present application were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mamodaly in view of Applicant's Prior Art Figures and U.S. Patent Application Publication No. 2002/0011662 (hereinafter "Komiya"). For the reasons set forth below, this rejection is respectfully traversed.

Like Mamodaly and Applicant's Prior Art Figures, Komiya fails to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 8 of the present application. Komiya, which discloses a design that provides a low-impedance connection between a high-speed circuit and a capacitor in the power supply path (*see* Komiya, Abstract), is completely silent as to a unitary capacitor having an aperture formed therein, and thus, necessarily cannot disclose the limitations of amended independent claim 8 of the present application missing in Mamodaly and Applicant's Prior Art Figures.

In view of the above, Mamodaly, Applicant's Prior Art Figures, and Komiya, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 8 of the present application. Thus, amended independent claim 8 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, and Komiya. Dependent claims 9 and 17 of the present application are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 14

Claim 14 of the present application was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mamodaly in view of Applicant's Prior Art Figures and U.S. Patent No. 6,072,211 (hereinafter "Miller"). For the reasons set forth below, this rejection is respectfully traversed.

Like Mamodaly and Applicant's Prior Art Figures, Miller fails to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 8 of the present application. Miller, which discloses a semiconductor package that uses an insulator to form a shunt capacitor (*see* Miller, Figure 1), is completely silent as to a unitary capacitor having an aperture formed therein, and thus, necessarily cannot disclose the limitations of amended independent claim 8 of the present application missing in Mamodaly and Applicant's Prior Art Figures.

In view of the above, Mamodaly, Applicant's Prior Art Figures, and Miller, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 8 of the present application. Thus, amended independent claim 8 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, and Miller. Dependent claim 14 of the present application is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 15

Claim 15 of the present application was rejected under 35 U.S.C. § 103(a) as

being unpatentable over Mamodaly in view of Applicant's Prior Art Figures, Miller, and Barnett. For the reasons set forth below, this rejection is respectfully traversed.

As discussed above, Mamodaly, Applicant's Prior Art Figures, Miller, and Barnett each fail to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 8 of the present application.

In view of the above, Mamodaly, Applicant's Prior Art Figures, Miller, and Barnett, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 8 of the present application. Thus, amended independent claim 8 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, Miller, and Barnett. Dependent claim 15 of the present application is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 16

Claim 16 of the present application was rejected under 35 U.S.C. § 103(a) as being unpatentable over Mamodaly in view of Applicant's Prior Art Figures, Barnett, and Pape. For the reasons set forth below, this rejection is respectfully traversed.

As discussed above, Mamodaly, Applicant's Prior Art Figures, Barnett, and Pape each fail to disclose the limitation of the uncovered peripheral portion having a surface area no greater than 21% of a total surface area of a top surface of a package substrate as recited in amended independent claim 8 of the present application.

In view of the above, Mamodaly, Applicant's Prior Art Figures, Barnett, and

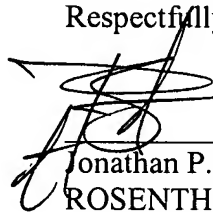
Pape, whether considered separately or in any combination, fail to show or suggest the present invention as recited in amended independent claim 8 of the present application. Thus, amended independent claim 8 of the present application is patentable over Mamodaly, Applicant's Prior Art Figures, Barnett, and Pape. Dependent claim 16 of the present application is allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

IV. Conclusion

The above amendments and remarks are believed to require no further prior art search. Also, Applicant believes this reply to be responsive to all outstanding issues and place this application in condition for allowance. If this belief is incorrect, or other issues arise, do not hesitate to contact the undersigned or his associates at the telephone number listed below. Because the amendments and remarks simplify the issues for allowance or appeal, and do not constitute new matter, entry and consideration thereof is respectfully requested. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03226.092001;P5787).

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Respectfully submitted,

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